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Chickpea in the Mediterranean production systems: two contrasting examples of possible developments in Algeria and France

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SUMMARY - Case studies of importance of chickpea in two contrasting production systems of the Mediterranean basin are presented. In Algeria, where is very favourable market for kabuli type chickpea, the rate of increase in production is low because of low yields and low economic competitiveness of the crop at current yield level against other crops. Increased productivity through improved production practices and cultivars would improve the expansion of the crop in Algeria. In France, where production areas are limited and market demand for human food is small, higher yields are obtained because of more favourable climatic conditions. There the crop can be promoted as animal feed to complement the protein requirement in animal rations, for which market demand is high.

RESUME - "Le pois chiche dans les systèmes de production méditerranéens: deux exemples contrastés de possibles développements en Algérie et en France". Nous présentons des études de cas sur l'importance du pois chiche dans deux systèmes de production contrastés du bassin méditerranéen. En Algérie, où le marché du pois chiche de type kabuli est très porteur, l'accroissement de la production est limité par la faiblesse des rendements, rendant le pois chiche peu compétitif par rapport aux autres cultures. L'augmentation de la productivité par l'amélioration des techniques culturales et la création variétale devraient permettre le développement de la culture en Algérie. En France, où les zones de production sont limitées et où la demande pour l'alimentation humaine est faible, des rendements supérieurs sont obtenus grâce à des conditions climatiques plus favorables. Dans ce cas la culture peut être développée en tant que protéagineux afin de complémenter en protéines les rations animales, marché pour lequel la demande est forte.

Introduction

In this paper we aim to assess the growing economic importance of chickpea in the agricultural production systems of the Mediterranean using the case studies of two contrasting countries, Algeria and France. In Algeria, where market is very favourable for the kabuli type chickpea, production is developing very slowly because of low yields in the recent periods and competition with other crops for land which is limited. Our research base is made up principally of the joint work carried out at Sidi Bel Abbes in cooperative programme between the ITGC, the INRA and the ICARDA.

In France, the markets and production areas are smaller but with more favourable climatic conditions, higher yields can be attained. It is thus possible to envisage using this plant like the fodder pea, as a complement for animal rations. The observations in this paper are based on the research carried out in the Provence-Alpes-Côte d'Azur region.

Chickpea in Algeria

It is thought that Algeria annually imports about 120,000 tons of pulses; however there are no statistics on actual amount for different species. If we suppose that half of these imports are made up of chickpeas, the imports would be three or four times the quantity of

chickpeas that the country produces. Whatever be the degree of inaccuracy ain these figures, they show the importance of the crop for the country.

Despite a remunerative price (6 dinars/kg in 1987-88), the increase in area under this crop has not occurred. There are two basic reasons for this. Firstly, the yields have remained too low to compensate the production costs. Secondly, the crop receives a strong competition for a place in the rotation from fodder crops which are very remunerative because of high price of meat.

Production cost of the chickpea

The data on the production costs derived from the work carried out by the ITGC[1], revealed that the direct production costs of the crop in 1987 came to 2,000 dinars/ ha for the crop with mechanical harvesting and 2,500 dinars/ha when the harvest was manual. The loss of seed with mechanical harvest was about 100 kg per hectare, which makes the two methods equivalent in terms of costs, since at that time, the selling price of the chickpea was 5 dinars/kg.

One can see that it is necessary to harvest at least 4 quintals (mechanical harvesting) or 5 quintals (manual harvesting) to cover the direct costs, without taking into account the general running costs. One can also note (Table 1) that the national average yield since 1979 has never exceeded 400 kg/ha and that since 1982 it has been considerably below this level[2].

Table 1 also shows that the area cultivated by the private sector has been constantly diminishing since the end of the 1970's. On the contrary, in the socialist sector, areas sown with crops have been increasing since 1983, but this unfortunately has only led to an insufficient increase in production, with yields remaining low, at 300 kg/ ha.

In 1988, the price of the chickpea increased by 20%, reaching 6 dinars/kg today, but it seems that overheads have also increased in proportions which we are unable to estimate here. In these conditions, yields would need to increase by 25%, for direct costs to be paid by the produce sold and probably by 50% at least for this crop to become attractive. Moreover, the trials (of a "demonstration" level) on which the calculations mentioned above were based, gave yields of 600 kg/ha (mechanical harvesting) and 700 kg/ha (manual harvesting) in 1987 at Sidi Bel Abbes.

Assuming a national average yield of 500 kg/ha, about 120,000 extra hectares should be sown to chickpea

Table 1. The chickpea in Algeria.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
CULTIVATED AREA (1000 ha)	34	41	41	41	43	34	40	48	62	63
- socialist sector	16	21	21	23	22	18	24	35		
- private sector	18	20	20	18	21	16	16	13		
PRODUCTION (1000 t)	26	22	17	16	17	9	10	13	20	19
- socialist sector	12	10	7	6	7	3	4	7		
- private sector	14	12	10	10	10	6	6	6		
YIELD (kg/ha)	760	530	400	390	390	260	240	260	330	300
- socialist sector	750	480	330	260	320	170	170	200		
- private sector	770	600	500	550	480	370	370	460		

Source: Statistical directory of Algeria from 1977 to 1984.
FAO annual astatistics for 1985 and 1986.

(i.e. tripling the area) to satisfy the national demand. It is a high stake, as the price paid at the moment is relatively close to the international price, at the 1988 exchange rate, whereas the price of cereals paid to the producer is twice that of the price paid in Europe and three times that of the world market price. If yields can be improved, Algerian farmer could have a greater interest to develop chickpea production than wheat production until self- sufficiency in chickpeas is attained.

The place of the chickpea in agricultural production system

Algerian agricultural holdings have a very dispersed structure: small private farms are located side by side with the large concerns which grew out of the colonization in the period of socialization of agriculture.

The majority of small farms have less than 5 hectares per worker. Here chickpea is cultivated to be eaten on the farm and any surplus is sold on the rural markets. It is in these concerns that the harvesting, and also the weeding, will continue to be manual for a long time to come.

These is a large workforce in these concerns available for the weeding and manual harvesting of small areas. The holders have not mastered mechanization so far in these concerns.

In larger concerns (collective agricultural concerns, usually with an area of above 100 hectares and having their own equipment) a ratio of 20 hectares of usable

(1) Report of the "Agronomical" Research Programme ITGC - ICARDA - INRA. September 1987 - Algiers.
(2) Table 1 also shows that yields are higher in the private sector; it would be interesting to know if the high rate of manual harvesting explains this difference.

agricultural land per worker is often attained and it leads one to envisage completely mechanized crop cultivation.

The advantage of chickpea in these cereal dominated production systems, whose performance is generally limited by drought, is that it is at the head of the crop rotation. In practice, the place of this crop will be in competition with fallow or fodder crops. If the chickpea replaces fallow, the advantage of this crop will be judged apart from the supplementary income which it brings, through the advantages of tillage of land because the fallow land before a wheat crop is generally not cultivated although it is recommended. This is not withstanding the fact that significance of tillage during the fallow period on the soil moisture conservation is disputed.

On the other hand, if the chickpea replaces grazing fallow (producing 300 to 500 FU/ha without any work) or a fodder crop (1500 to 2000 kg/ha of dry matter, 1000 FU/ha approximately) its economic value will have to be assumed by considering the loss that exists because one does not have this fodder. If one takes as a reference the price of fodder since 1987 (2 to 4 dinars/kg, as opposed to 6 dinars for the chickpea), one needs a chickpea yield of 800 to 1000 kg/ha for the income to be equivalent. The high price of fodder can be understood in the context of drought and the relatively high price of meat in comparison with cereals. It is also clear that if the price of fodder comes down to a more realistic price (i.e. half of the present price) a yield of 500-600 kg/ha for the chickpea will be enough to make this crop competitive.

This reasoning is of course based on our knowledge of the systems of cereal production of western Algeria. We think, however, that it is possible to draw conclusions of more general significance. The extension of chickpea cultivation is governed by two basic economic factors: firstly, the structure of production cost of the chickpea is not fundamentally different from that of cereals. If the price at which it is sold is two times higher, its yield must attain at least half that of cerals. Now, in the case of Algeria, the yield is below half that of wheat. If, on the contrary, the gap between the wheat price and the chickpea price is larger, and if the yields of this crop come near to those of cereals, the chickpea will become a very interesting crop. Secondly the expansion of the crop would also depend on its comparative economic advantage over the other possible crops at the head of the crop rotation. The example of western Algeria given above illustrates well how the present price system for chickpea does not encourage its production to be developed.

Since the chickpea is in competition with different fodder crops, it may also be possible to obtain yields in fodder units for fodder varieties of chickpea at a price which would be competitive with traditional fodder. This consideration will have to be linked with an assessment of the nutritional value of chickpea as a fodder crop. One must however not forget that the very high prices noted over the last year for straw and hay in Algeria can be explained not by the nutritional value of the fodder but by the necessity of including a sufficient amount of roughage in the animal ration.

Chickpea in France

The place of the chickpea in the cereal crop systems in France seems relatively limited, principally in the areas along the Mediterranean coast. However the stakes are high, since in these areas there is a progressive reduction in the traditional Mediterranean crops (vines, lavender) because of replacement by cereals. The conditions for cereals are, however, not always optimal in the context of a very saturated market.

The current chickpea market is mainly for human consumption, and 10,000 tons are currently imported per year. With a yield of 2000 kg/ha, 5,000 hectares are enough to saturate the kabuli chickpea market. Thus the current market is rather limited.

On the basis of the above yields and a price of 5 Fr/kg, the gross margin comes to 6,000 Fr and corresponds to 60% of the value of the produce (Boissiere, 1985). If one takes as normal fixed costs of 3,000 Fr/ha, there remains an equivalent sum as profit to the farmer, a value which is equal or higher than that recorded for other pulses (Boissiere, 1985).

On the other hand, the situation is less clear for the chickpea grown for animal consumption, which should however benefit from a large market for proteinaceous crops similar to what has happened lately for the fodder pea. Indeed, at a price of 2 Fr/kg, which is identical to that of the fodder pea, a yield of 5000 kg/ha must be attained with chickpea to obtain the same margin of profit. That appears to be possible on the basis of the results obtained at the research stations. Chickpea can, therefore, become a highly competitive crop in the research crop rotation in the dry cereal areas of the French Mediteranean, being better adapted and less costly than sunflower or colza, the crops for which support-price is now decreasing.

Conclusion

As a conclusion, it is clear that the future of this crop is always linked to the evolution of yields, the market being relatively favourable. However it is necessary, from the economic point of view, to work in accordance with several related considerations of opportunity cost as compared to the other crops.

In the countries to the south of the Mediterranean sea, if an increase in yields must be looked for, it must be

accompanied by the development of production techniques. It is obvious that the food situation of the countries and the low proportion of lands receiving sufficient rainfall leads one to give greater importance to chickpea cultivars suitable for human consumption. In the countries to the north of the Mediterranean sea, the development of this production aimed at human consumption will rapidly encounter limits due to a limited market. On the other hand, if the cultivars with higher yield potential are developed they could help in alleviating the shortage of proteinaceous material for animal feed as has occurred with fodder peas in the temperate zone. Market for this type of chickpea could be substantial, and it could permit restoration of some area in the region to a traditional Mediterranean crop.

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